Gridded Products Outreach Images

Bjorn Lambrigtsen
Jet Propulsion Laboratory

Level 3 - Gridded Products

(for Stephanie Granger - L3 lead)

Product Definition
Algorithm Development

Development Approach

Temporal and Spatial Resolution (exploratory)

Data Volume

Examples

Schedule of Level 3 Milestones

Development Approach

- **Formal development to be done at JPL**
  - Development plan
  - Science requirements
  - Prototype/sample products
  - Product development
  - Algorithm development
  - Software development
- **Close coordination with Science Team**
  - Solicit input re. content, resolution, gridding, binning, etc.
  - Present & review plan & specifications
  - Present & review prototype products
- **Close coordination with external science users**
  - Solicit input through all available channels
    - AIRS & DAAC User Services; Web; Outreach; Collaborators; Conferences

Temporal and Spatial Resolution (Exploratory)

- **Spatial**
  - 1° x 1 ° resolution
    - Widely used
    - Commonly requested
- **Temporal** (All separated by ascending/descending orbits)
  - Daily products
    - Twice daily
    - Needed by modelers and data assimilators
  - Multi-day products
    - 5 days (“Pentad”)
      - *Advantages:* Used by Pathfinder; Used by some modelers
    - 8 days
      - *Advantages:* Tied to AIRS orbital repeat cycle; Used by MODIS & MISR
  - Monthly products
    - ~30 days
      - *Advantages:* Used by modelers; Tied to calendar
    - 32 days
      - *Advantage:* Tied to AIRS orbital repeat cycle

Data Volume Trade-off

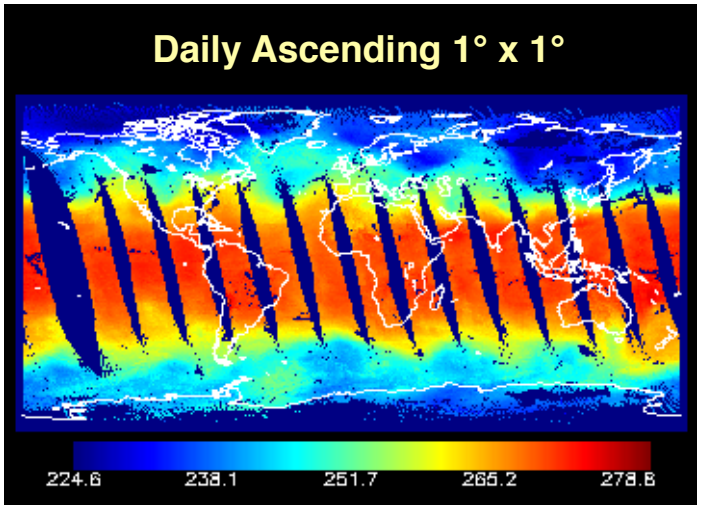
- **Assumptions**
  - Three (3) PGEs
    - Daily L3 PGE
    - Multi-day PGE (Pentad used in this example)
    - Monthly PGE (Calendar month used in this example)
  - HDF-EOS Grid Format (Same as AIRS Browse Summary Files)
  - All separated by ascending, descending orbits
- **Volume**
  - Daily PGE
    - Executes: Once per day
    - Input: 241 AIRS Level 2 files
      - Standard and Support products
    - Output: Two (2) Daily Level 3 Retrieval files
      - ~ 16 Mb/day each * 2 = 32 Mb/day * 365 = ~12 Gb/year
  - Multi-day PGE (Note: Pentad is assumed for this example)
    - Executes: Once every 5 (or N) days
    - Input: Five(5) Daily Level 3 Retrieval files
    - Output: Two (2) Pentad level 3 Retrieval files
      - ~16 Mb each * 2 (A, D) = 32 Mb/pentad * 73 = 2.3 Gb/year
  - Monthly PGE
    - Executes once every month
    - Inputs: 28 to 31 Daily Level 3 Retrieval Files
    - Outputs: Two (2) Monthly Level 3 Retrieval fiels
      - ~ 16 Mb * 2 = 32 Mb/month * 12 = 432 Mb/year

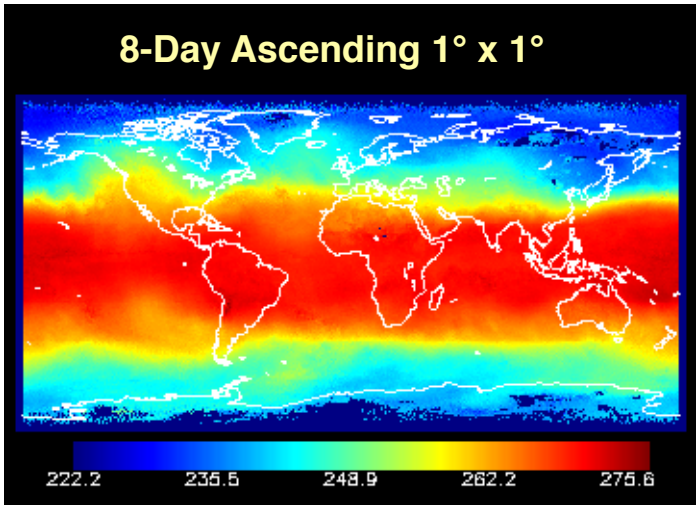
Data Volume Trade-off

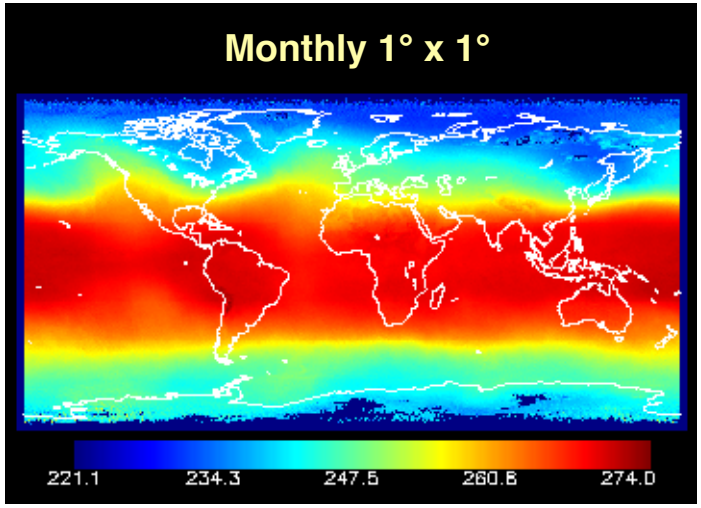
Data Volume Comparisons

	Level 2 Retrieved Products	Level 2 Support Products	Level 3 Daily	Level 3 Multi-Day (Petnad)	Level 3 Monthly
Volume/Daily	1.2 Gb	4.5 Gb	32 Mb	N/A	N/A
Volume/Monthly	36.0 Gb	135 Gb	~1 GB	192 Mb	N/A
Volume/Yearly	~432 Gb	1.6 Tb	~12 GB	2.3 Gb	384 Mb

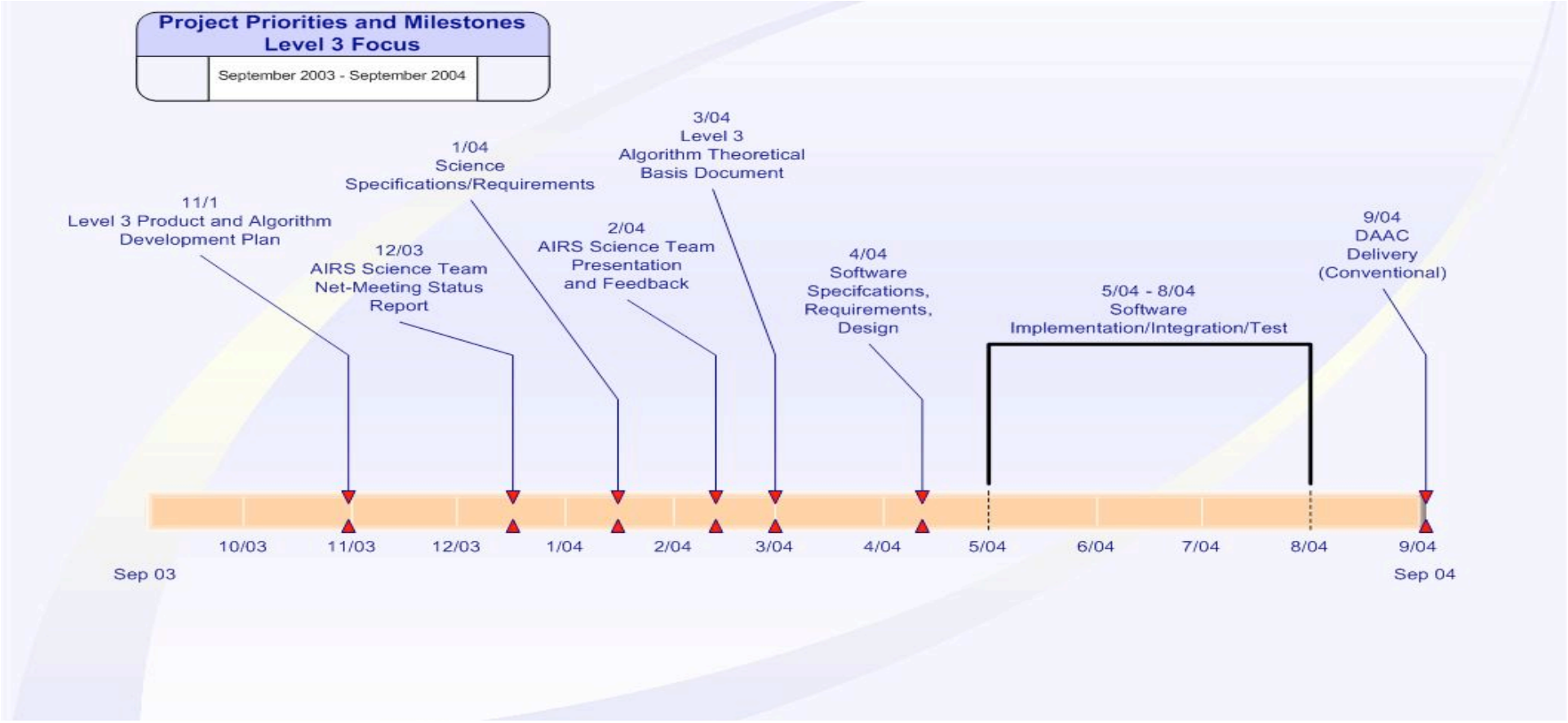
Examples Using 500 Mb Temperature







Schedule of Level 3 Major Milestones



Outreach News

(for Sharon Okonek - Outreach coordinator)

Hurricane media event

Hurricane Isabel

Educational outreach

AIRS web usage

Outreach - 1

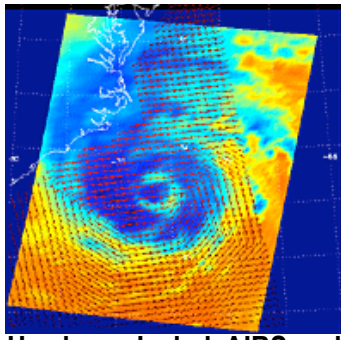
Hurricane Media Story

- Organized & coordinated by GSFC
- Images provided by JPL & Goddard visualization teams & others
- Representing a multi-mission, multi-sensor approach (including AIRS) to studying hurricanes
- Were used in over 40 live shots last month
- GSFC recorded ~ 150 ancillary hits from network and cable news feeds
  - Including CNN and ABC World News
- A videofile which contained AIRS imagery was aired on NASA-TV over a two-day period
  - NASA chose to air this videofile again the following week because Hurricane Isabel was in the news
- The video file contained these AIRS segments:
  - An interview with Mous Chahine
  - AIRS still image of hurricane Isidore
  - AIRS visualization of isotherms from supertyphoon Pongsona
  - Existing materials from previous AIRS video files

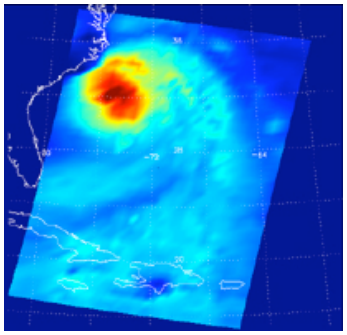
Outreach - 2

Hurricane Isabel

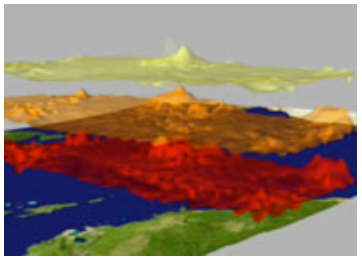
- AIRS infrared and total water vapor images of hurricane Isabel were included in a videofile that aired on NASA-TV Sept 19-22
- The data was retrieved on September 18 when Isabel was at category 2 strength
- The following imagery (with captions) of Isabel was also created
  - AIRS infrared image overlaid with Seawinds scatterometer data
  - AIRS infrared image overlaid with Quickscat data
  - Total water vapor image
  - Difference image from September 13 when Isabel was at category 5 strength.



Hurricane Isabel, AIRS and SeaWinds



Hurricane Isabel, total water vapor image



Still from visualization of hurricane Isabel's isotherms

Outreach - 3

Miscellaneous

- Joyce Aston, a dynamic teacher at Kastner Intermediate School in Fresno, California, asked for (and received) AIRS materials to refer to in her classroom
  - Ms. Aston writes “I'm going to be starting the GLOBE program in one of my classes this year, in conjunction with some work I did in Bolivia (the Amazon basin & the Andes) this summer. This AIRS sounds like it would be something that would be worth using in all my classes.”

- AIRS Public Web Site averages 7500 hits per month
- **With all the hurricane Isabel imagery from AIRS during the month of September, the total number of hits increased to 14,253**
- “Hurricane” is a frequent search word

Outreach - 4

WE WANT YOU! (but mostly your images)

Put Your Images On The AIRS Public Web Site

- Help keep our web site fresh and interesting
- Good visibility
- Submit images and caption to:

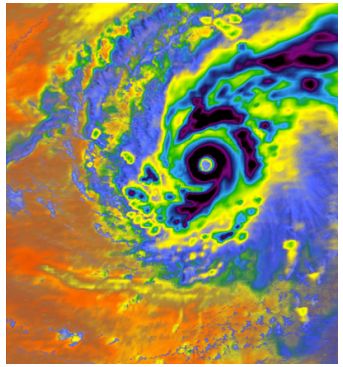
  sharon.okonek@jpl.nasa.gov

AND

If you would would like to order an AIRS T-shirt, please sign up ➡

- price will be around $10
- black T-shirt will feature the Pongsona graphic
- specify: name, email, phone, long or short sleeve, quantity, size
- Sharon Okonek will email the design and contact you before placing your order

SUPERTYPHOON PONGSONA



Images and Animations

Monthly mean radiance

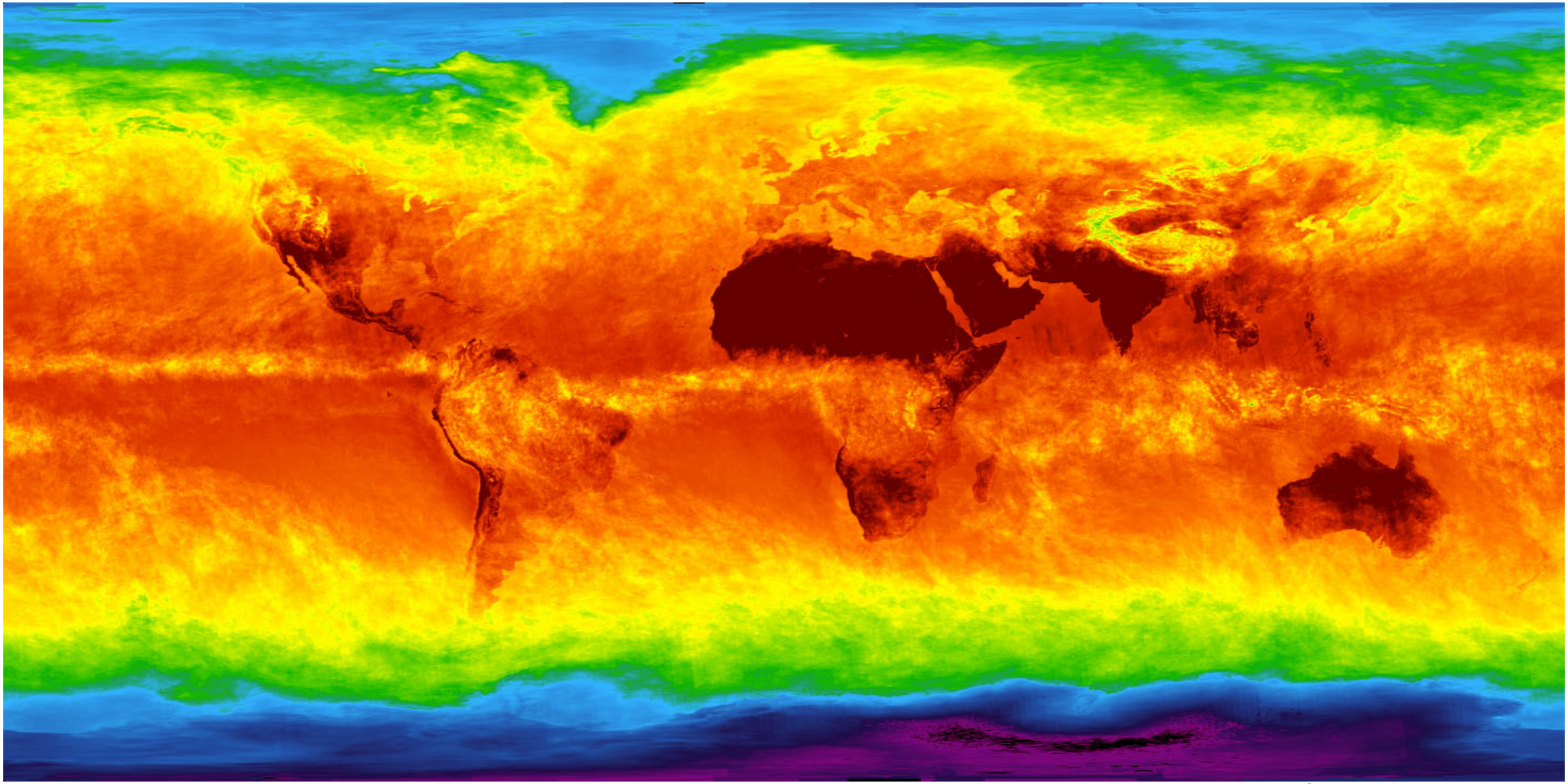
Isotherms

Supertyphoon Pongsona

Hurricane Isabel

AIRS Monthly Average Upwelling Radiance

April, 2003. 2616 cm^{-1}

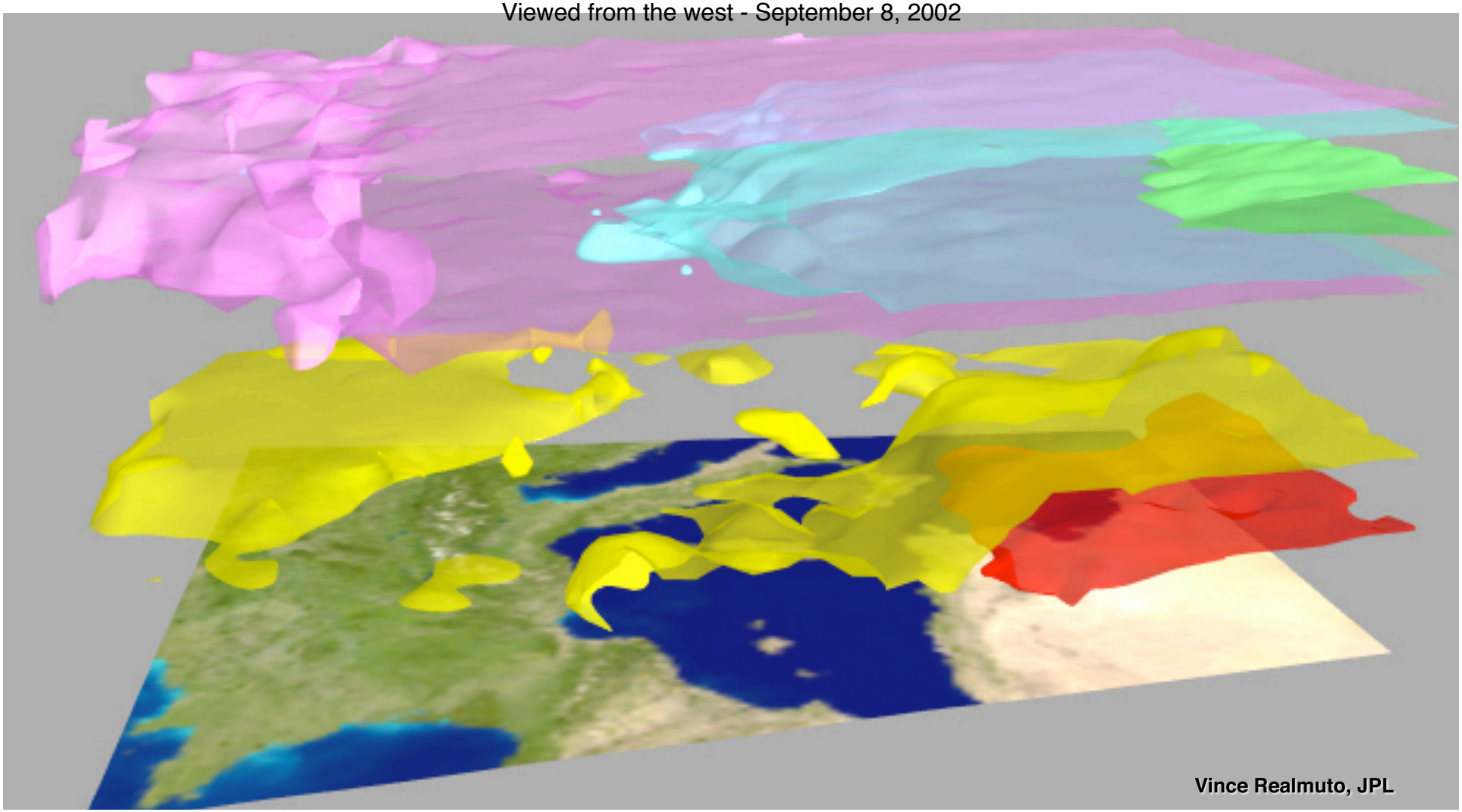


Charles Thompson, JPL

Jet Propulsion Laboratory
California Institute of Technology

AIRS Retrieved Isotherms over Southern Europe

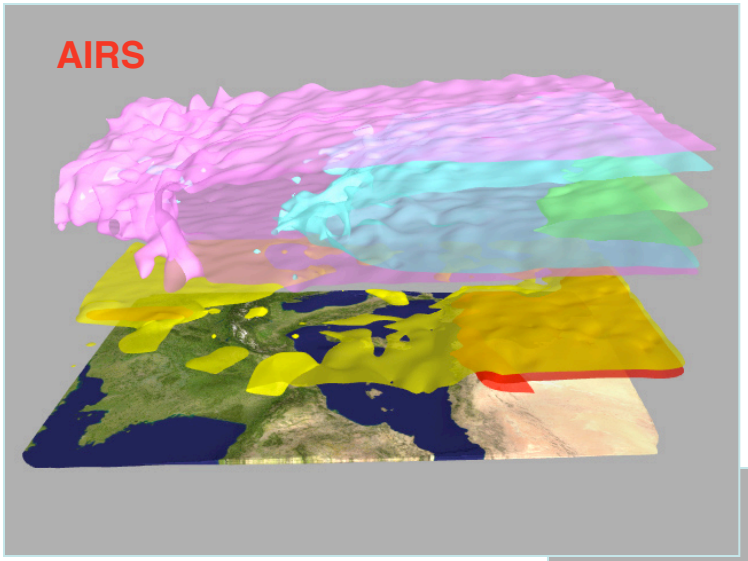
Viewed from the west - September 8, 2002

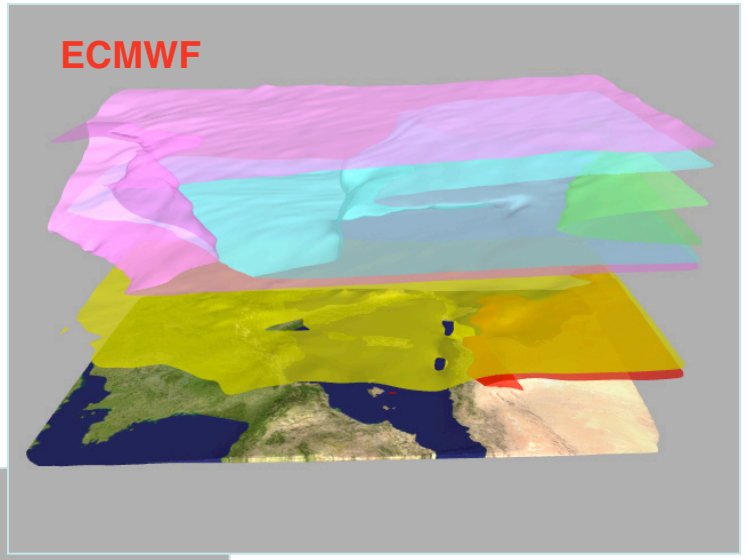


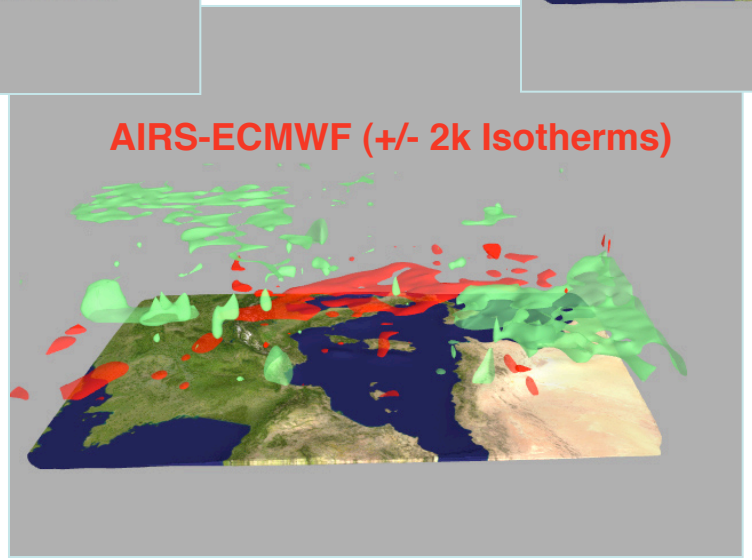
Vince Realmuto, JPL

Isotherms: AIRS vs. ECMWF

September 8, 2002



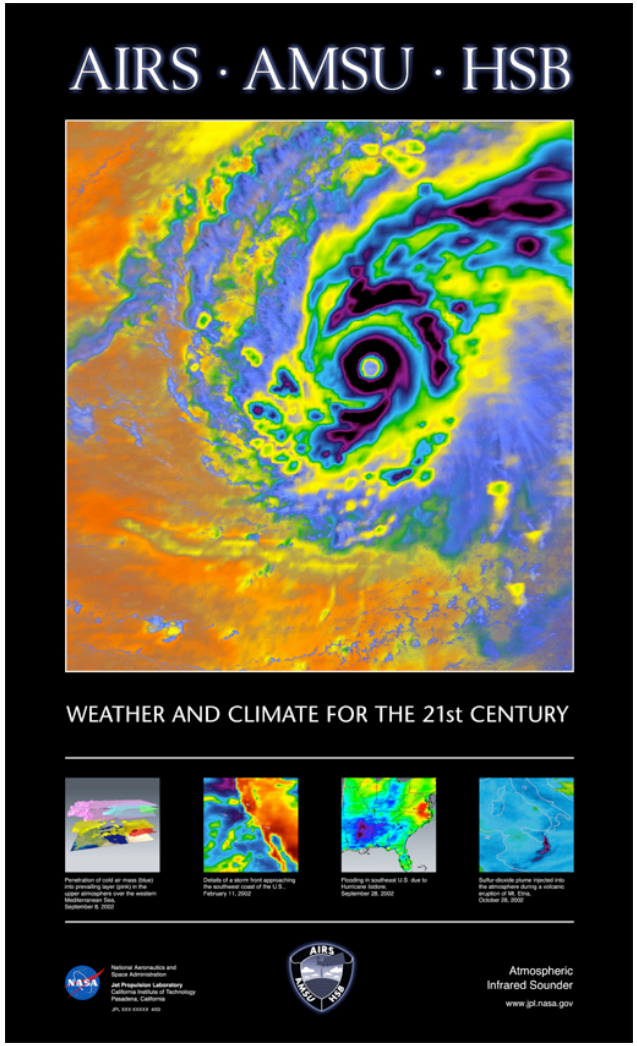




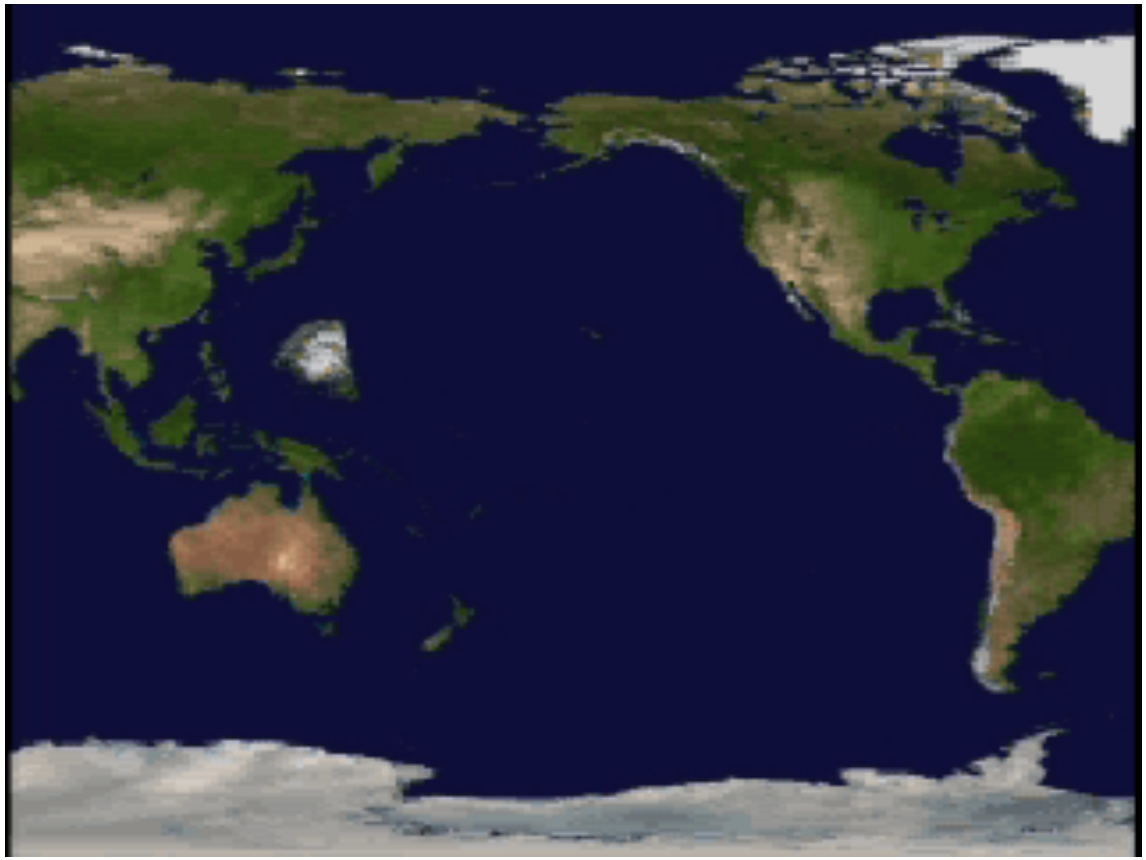
Vince Realmuto, JPL

Supertyphoon Pongsona

December 8, 2002



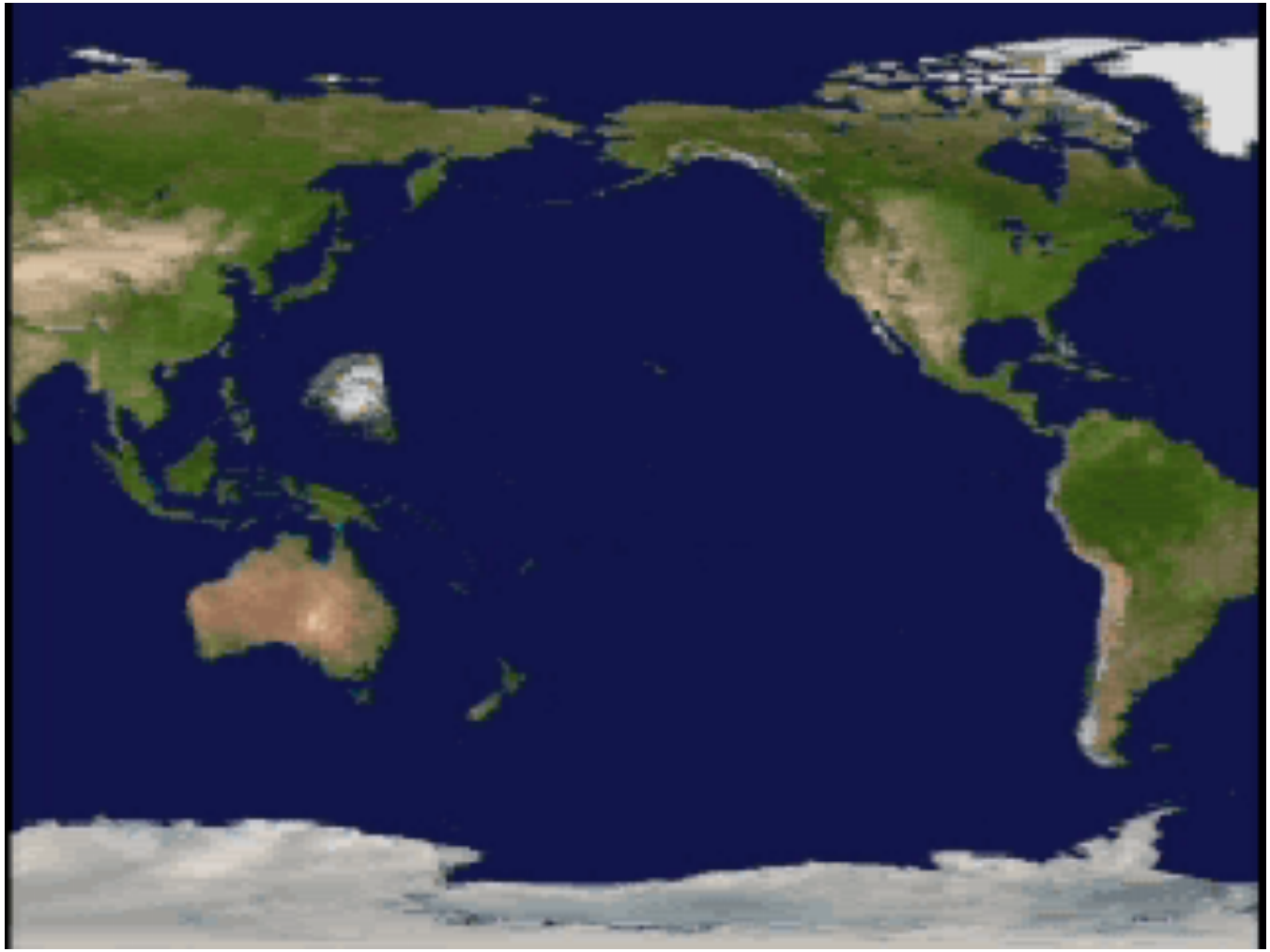
S. Okonek



GSFC

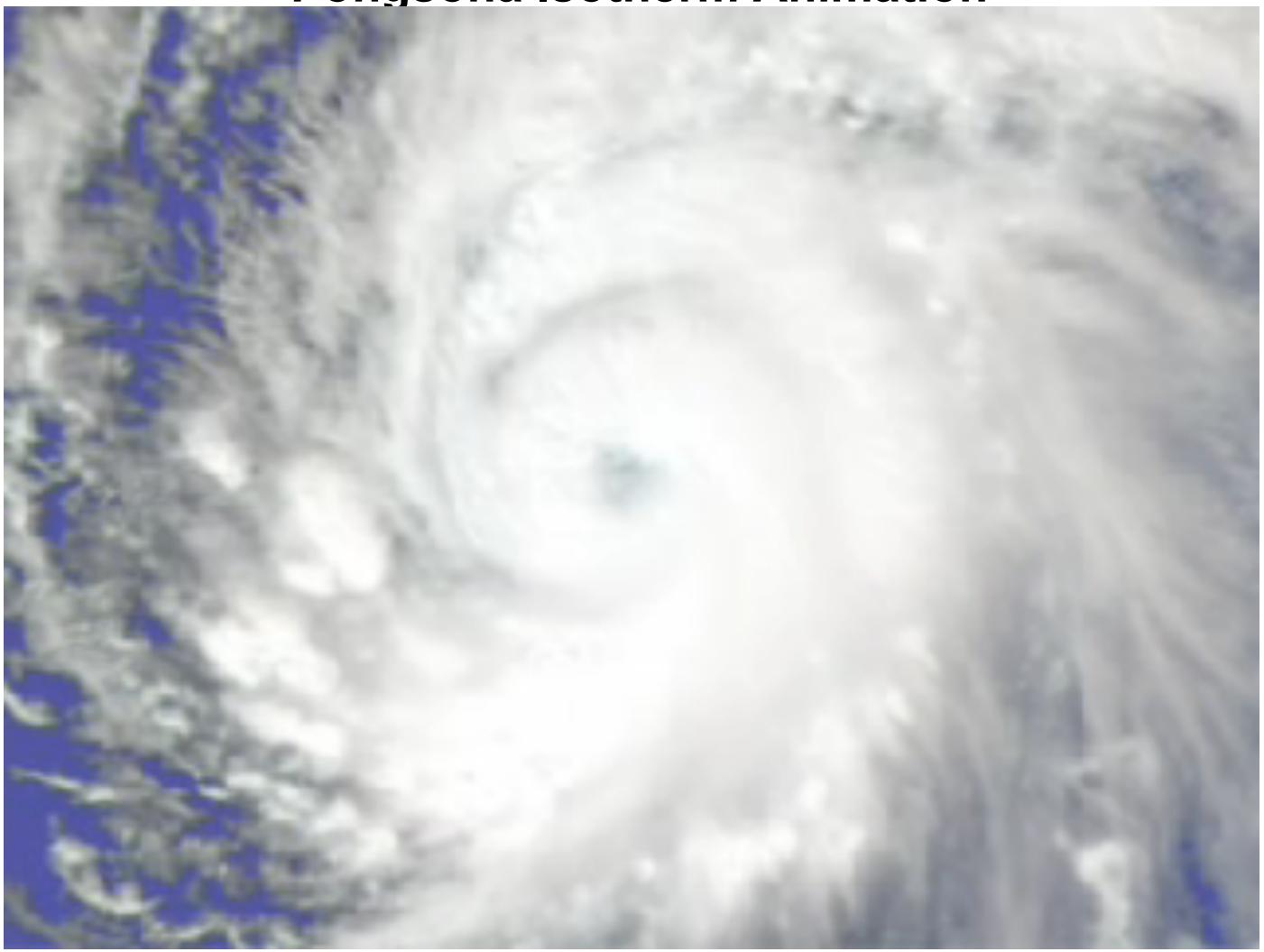
Pongsona Outline Animation

Cloud top heights estimated from AIRS window radiance; HSB overlaid



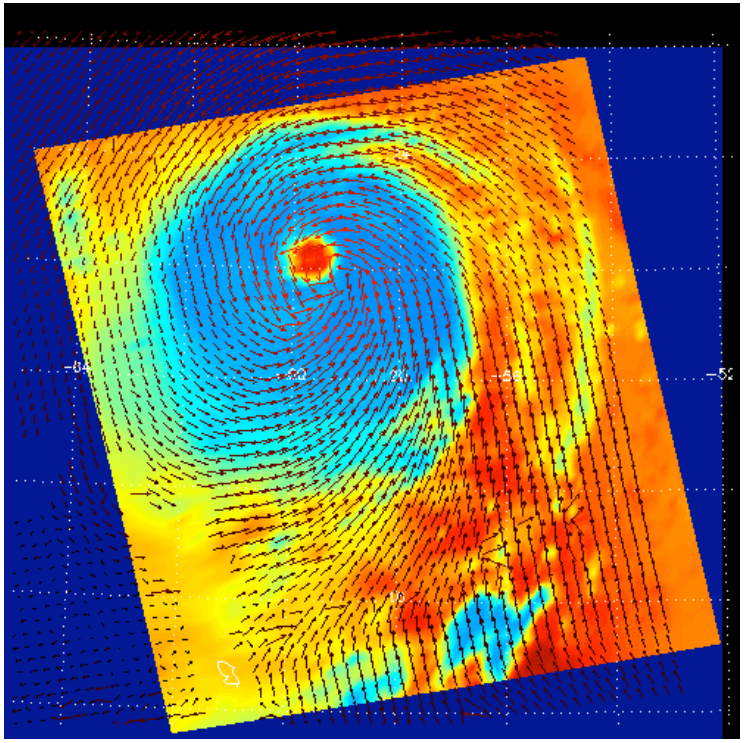
GSFC

Pongsona Isotherm Animation

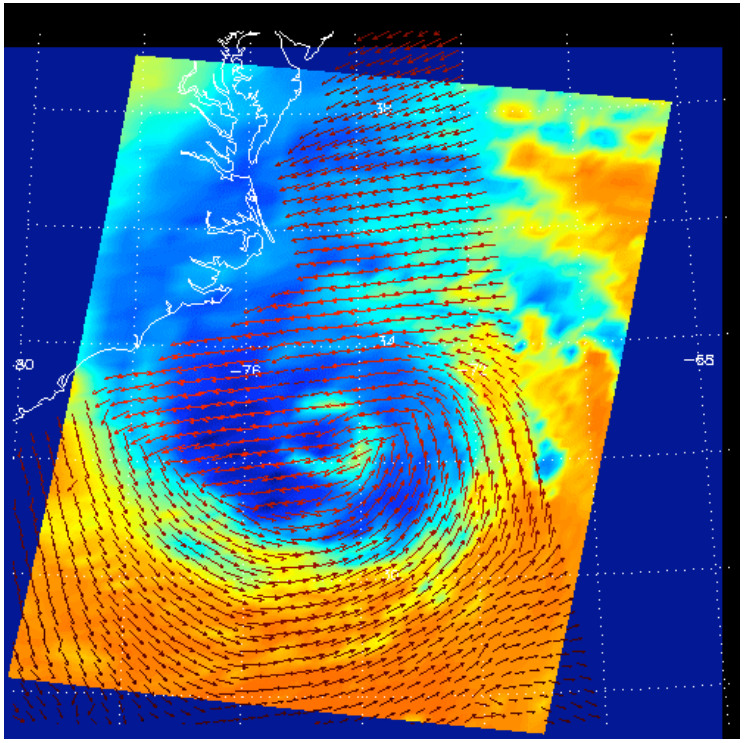


Vince Realmuto, JPL

Hurricane Isabel: AIRS + Scatterometers



Category 5, September 13

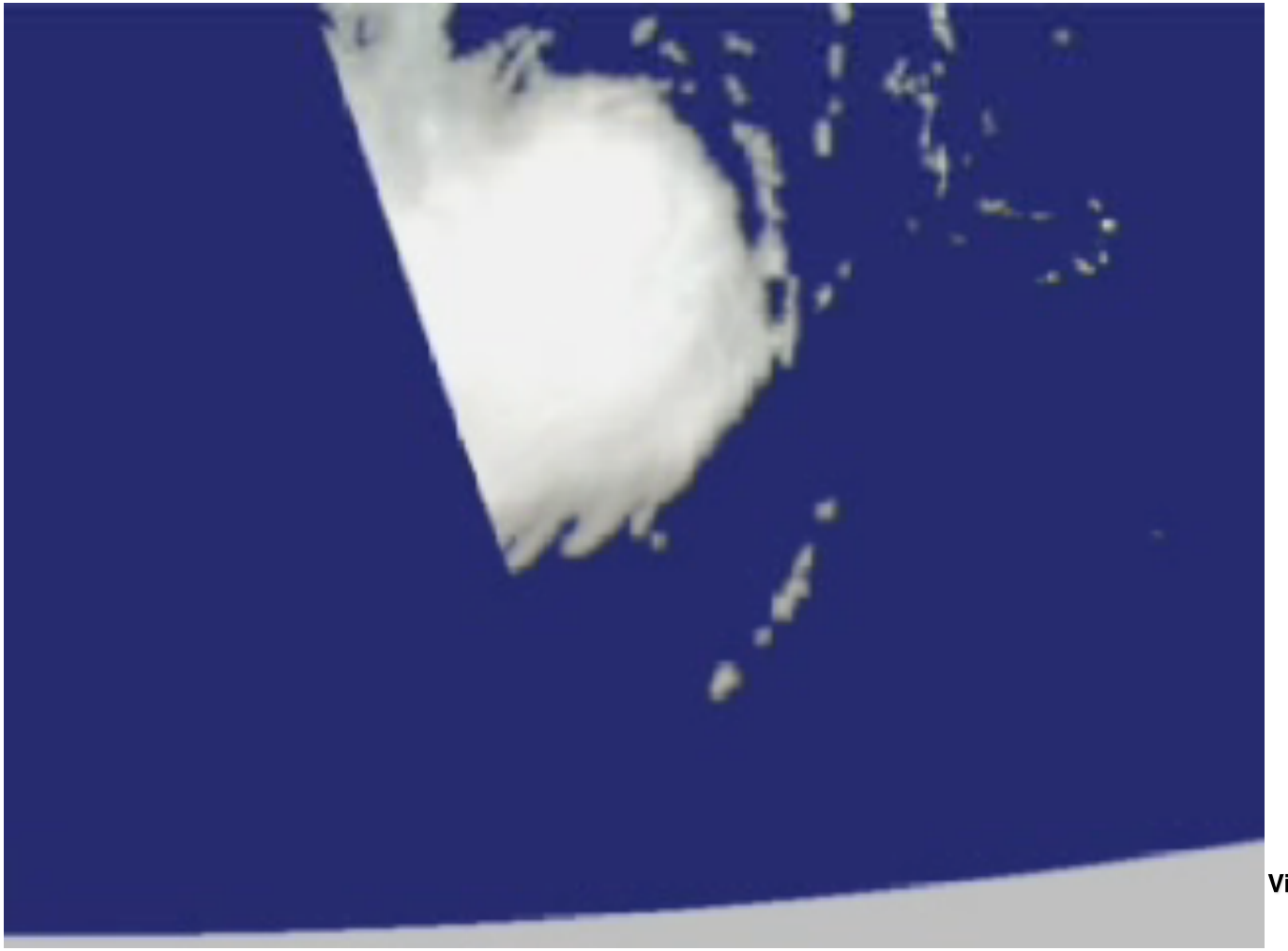


Category 2, September 18

Stephanie Granger
Scott Dunbar, JPL

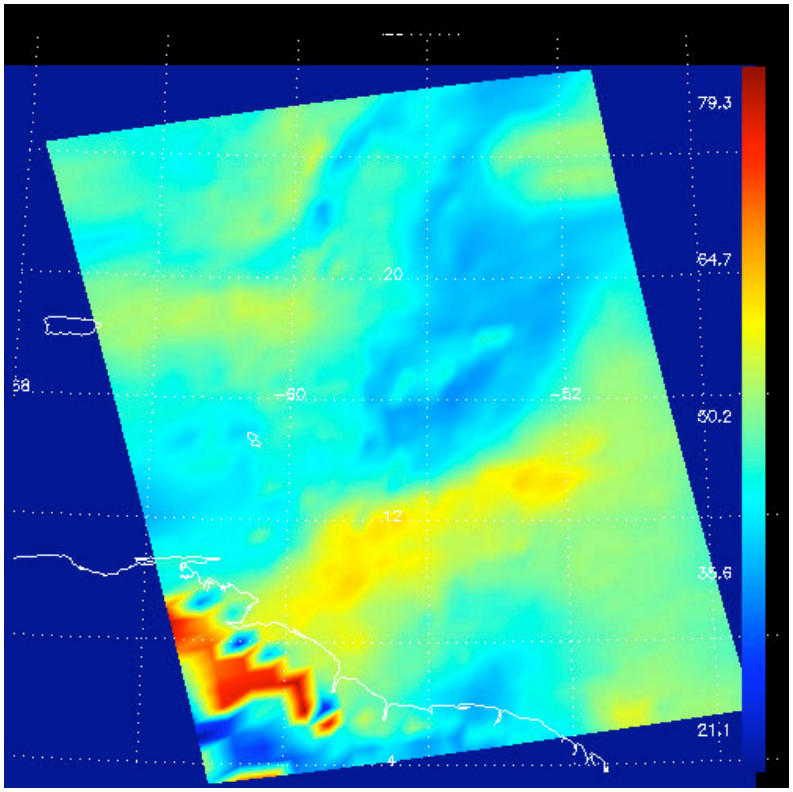
Hurricane Isabel Isotherm Animation

September 6 - September 18, 2003

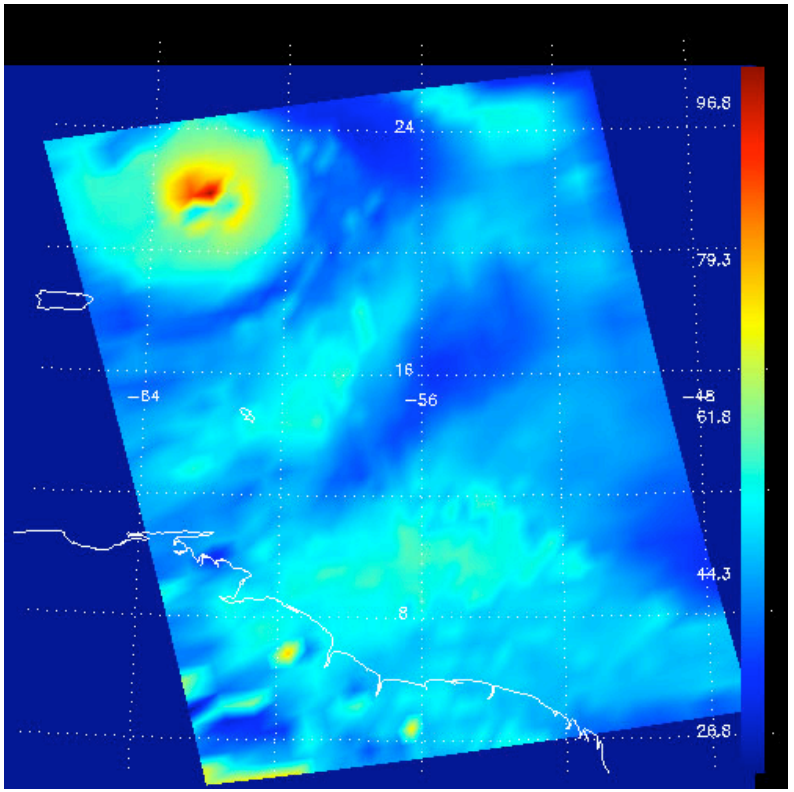


Vince Realmuto, JPL

Water Vapor Before & After Isabel



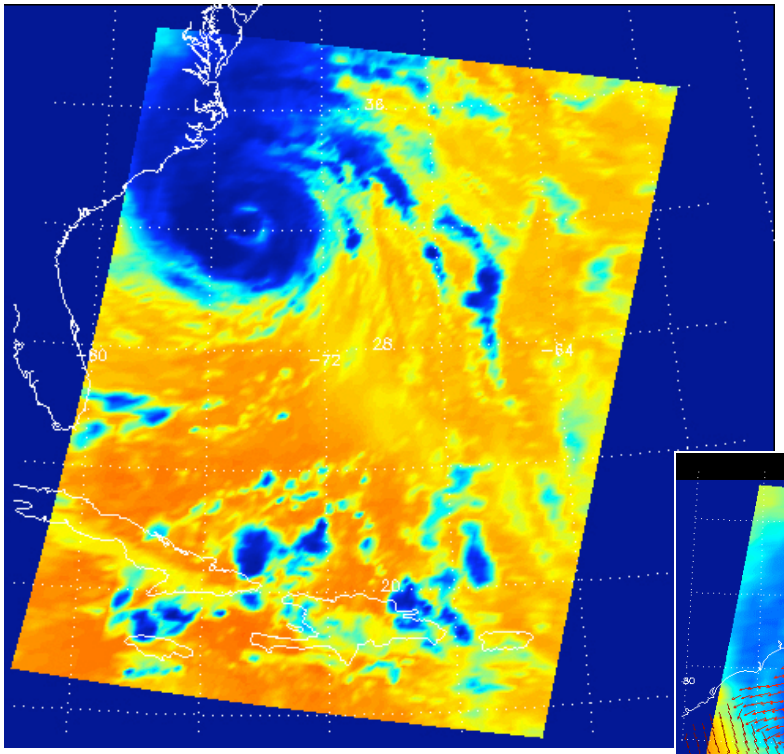
Before Isabel, August 28



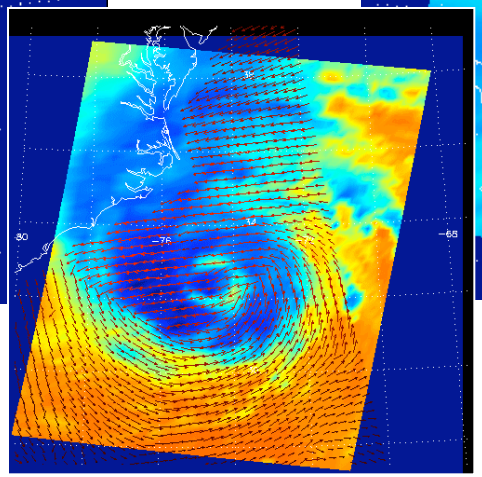
After Isabel, September 13

Edward Olsen
Stephanie Granger, JPL

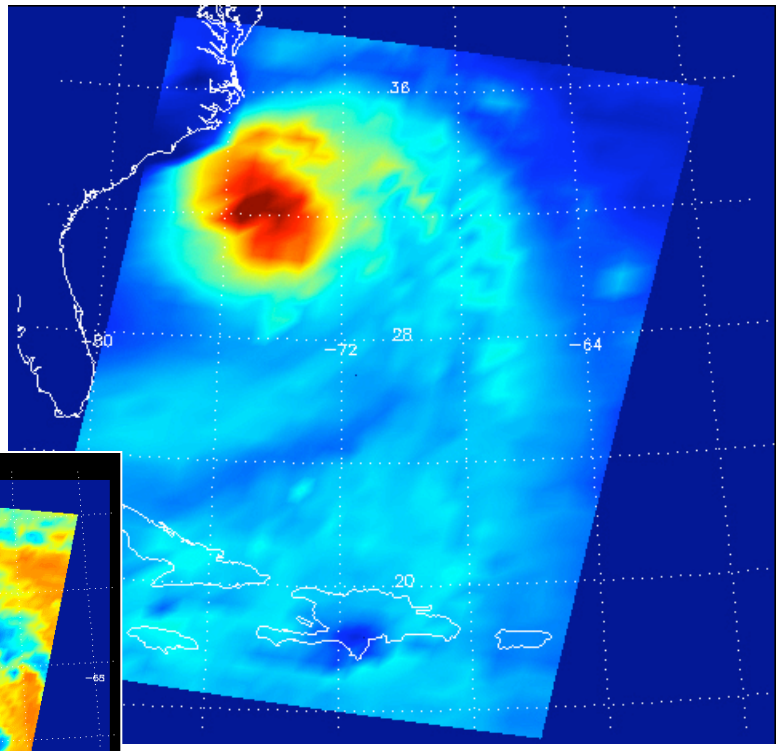
Isabel at Landfall



AIRS Window Channel (2616 cm^{-1})



AIRS/Aqua + SeaWinds/QuikSCAT



AIRS Total Water Vapor

Edward Olsen
Stephanie Granger
Scott Dunbar, JPL